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(71) Applicants and
(72) Inventors: **FOWLER, Graeme, Charlton** [AU/AU]; Boyup Brook Road, Donnybrook, Western Australia 6239 (AU). **FORREST, Lindsay, Alexander** [AU/AU]; Pincers Brook, Wellington Mills Road, Lowden, Western Australia 6240 (AU).

(74) Agent: **WRAY & ASSOCIATES**; 239 Adelaide Terrace, Perth, Western Australia 6000 (AU).

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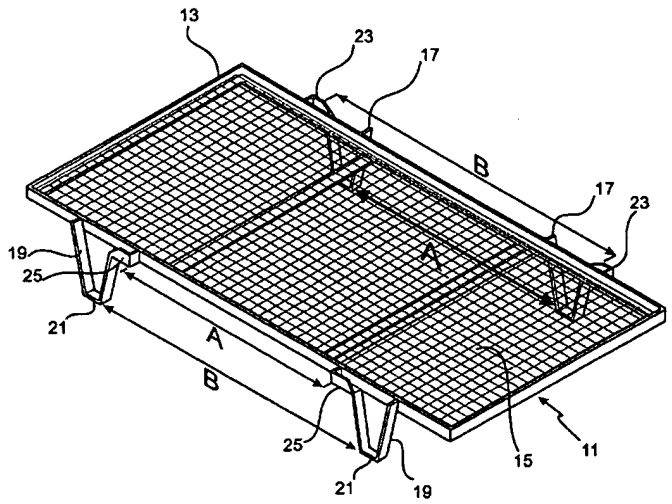
For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: STACKING AND NESTING RACK OR PALLET WITH LEGS



(57) Abstract: A stacking rack comprising a substantially planar tray (11) having two opposed sides, each opposed side supporting a plurality of downwardly depending legs (17 and 19) wherein the legs (17) at one side are spaced apart along the side by a first spacing (A) and the legs (19) at the other side are spaced apart by a second spacing B), the first spacing (A) being less than the second spacing (B), each opposed side supporting a set of supports (23 and 25) which are in one to one relationship with the legs of the opposed side, each support being configured to receive the lower end of a leg, the supports (23) at the one side being spaced apart by the second spacing (B) and the supports (25) at the other side being spaced apart by the first spacing (A), each of the legs having an open upper end and having an internal configuration which is able to receive another leg through the upper end to at least partially accommodate the other leg.

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Title: Stacking Rack

Field Of The Invention:

This invention relates to a stacking rack.

Background

In the transportation of some goods utilising stacking racks or pallets it is necessary to ensure that no load is exerted on the goods. As a result it is a requirement of the pallets that are used in such transportation that, when the pallets with their loads are stacked one upon the other, the weight of overlying pallets is borne by the lower pallets. This requires the use of a spacing means between the stacked pallets where the spacing means will transmit the loading between the stacked pallets. Where the spacing means is incorporated into the structure of the pallet a problem is created in regard to the transportation of the empty pallets back to the point of supply for the goods due to the magnitude of the volume of the stacked pallets.

Throughout the specification the term stacking rack shall be taken as including stacking racks, pallets and like support trays which are able to accommodate a number of items for transportation purposes.

Disclosure of the Invention

Accordingly the invention resides in a stacking rack or pallet comprising a substantially planar tray having two opposed sides, each opposed side supporting a plurality of downwardly depending legs wherein the legs at one side are spaced apart along the side by a first spacing and the legs at the other side are spaced apart by a second spacing, the first spacing being less than the second spacing, each opposed side supporting a set of supports which are in one to one relationship with the legs of the opposite side, each support being configured to receive the lower end of a leg, the supports at the one side being spaced apart by the second spacing and the supports at the other side being spaced apart by the

first spacing, each of the legs having an open upper end and having an internal configuration which is able to receive another leg through the upper end to at least partially accommodate the other leg.

According to a preferred feature of the invention, two legs are located along each side.

According to a preferred feature of the invention each support and each leg is located outward of the perimeter of the tray.

According to a preferred feature of the invention each leg is of a substantially V-shaped configuration.

According to a preferred feature of the invention each leg is of a substantially U-shaped configuration.

According to a preferred feature of the invention each leg is of a generally tubular configuration.

According to a preferred feature of the invention each leg is of a substantially W-shaped configuration.

The invention will be more fully understood in the light of the following description of several specific embodiments.

Brief Description of the Drawings

The description is made with reference to accompanying drawings of which:

Figure 1 is an isometric view of a stacking rack according to the first embodiment;

Figure 2 is a side elevation of a stacking rack according to the first embodiment;

Figure 3 is a plan view of a stacking rack according to the first embodiment;

Figure 4 is a isometric view of a plurality of stacking racks according to the first embodiment stacked in their load carrying mode; and

Figure 5 is an isometric view of a plurality of stacking racks of the first embodiment stacked in their unloaded mode.

Detailed Description of Several Specific Embodiments

The first embodiment as shown in the drawings is directed towards a stacking rack which can be utilised to accommodate seedling trays.

It is a function of the first embodiment that when the stacking racks are in their loaded mode carrying seedlings they are stacked one upon the other with sufficient spacing between adjacent racks to accommodate the seedlings without endangering the seedlings and that when the stacking racks are in their unloaded mode at which they are empty they can be stacked in a manner which significantly reduces the volume of the stacked racks when compared to their loaded mode. This is achieved by enabling the spacing between adjacent stacked racks to be varied between that which exists when the racks are in their loaded mode and that which exists when they are in their unloaded mode.

The first embodiment comprises a stacking rack having a substantially rectangular tray 11 which is defined by a rectangular frame 13 which supports between it a suitable membrane 15 such as a mesh or plate in order that the seedling trays can be carried by the tray. The dimensions of the tray are such that a plurality of seedling trays can be snugly received on the tray within the confines of the frame 13.

The opposed major sides of the tray are provided with a pair of legs 17 and 19. The legs are fixed to the laterally exterior face of the frame 13. The legs at each side are spaced symmetrically along each side to be substantially equidistant from the centre of the respective side, and where the spacing A between the legs of the first pair of legs 17 at one side is less than the spacing B between the legs of the second pair of legs 19 at the other side. Each of the legs has a substantially V-

shaped configuration where the lower end of each leg is formed with a flattened portion to provide a foot 21. The configuration of the legs is such that their internal face is substantially complementary to their external face which enables the legs to be able to be stacked one upon the other.

In addition, the opposed major faces of the tray are provided with a pair of supports 23 and 25. The supports are fixed to the laterally exterior face of the frame 13. Each support 23 and 25 is configured to snugly receive the foot 21 of one of the legs 17 and 19. The spacing between the first pair of supports 23 located on the one side which accommodates the first pair of legs 17 is B while the spacing between the other pair of supports 25 which are located on the other side accommodating the second pair of legs 19 is A.

As shown in Figures 4 and 5, in use a set of racks according to the first embodiment can be utilised with a base rack 27 having a tray of corresponding form to the racks 11 but which does not incorporate a set of legs. Instead the base rack 27 is provided with a pair of cross members 29 which enables the base rack 27 to be located on the ground with the tray of the base rack 27 spaced above the ground a sufficient distance to allow the forks of a fork lift to be introduced underneath the tray. In addition the base rack 27 is provided with a set of supports 23 and 25 which facilitate accommodation of the legs 17 and 19 of a rack. Each of the opposed sides of the base rack are also provided with a pair second legs 31 and 33 which are of a reduced height when compared to the legs 17 and 19 of the trays but which will receive the legs of the trays when the base tray and the trays are in the unloaded mode as shown at Figure 5

As a result of the location of the first and second pairs of legs 17 and 19 and the first and second pair of supports 23 and 25 the racks according to the first embodiment can be stacked one upon the other in according to two modes comprising a loaded mode and an unloaded mode. As shown at Figure 4 when the racks are stacked in the loaded mode the first pair of legs 17 is positioned to be above the second pair of supports 25 and the second pair of legs 19 are located above the first pair of supports 23. As a result the racks are be stacked one upon the other whereby the trays are separated by a spacing substantially

corresponding to the height of the legs. In this mode the racks can each be used to support seedling trays whereby the seedlings can be stored and transported without suffering any damage and in a manner which enables air movement between the trays. In addition, in use when a plurality of racks according to the first embodiment are loaded in their load carrying mode as shown at Figure 4 diagonal bracing 35 can be mounted across one or both the ends of a set of racks to stabilise the racks in the loaded mode.

On the racks having been emptied of their load, the racks can be unstacked from the loaded mode and restacked according to the unloaded mode as shown at Figure 5. When the racks are in their unloaded mode they are positioned one above the other such that the legs 17 of the first pair of legs of each rack are located proximate the corresponding leg 17 of the first pair of legs of the adjacent racks and the legs 19 of the second pair of legs of each rack are located proximate the corresponding leg 19 of the second pair of legs. Because of the complementary nature of the legs the racks when in their unloaded mode can be stacked one upon the other, with the trays 11 in closely abutting relationship as shown in Figure 5. Therefore when the trays are empty of their load they can be readily stacked to occupy a minimum volume condition.

According to a second embodiment of the invention the legs have a generally U-shaped configuration.

According to a third embodiment of the invention the legs have a generally W-shaped configuration.

According to a fourth embodiment of the invention the legs have a generally tubular and tapered configuration whereby the legs of adjacent racks can be matingly interengaged.

Throughout the specification, unless the context requires otherwise, the word "comprise" or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

It should be appreciated that the scope of the present invention need not be limited to the particular scope of the embodiment described above. In addition the invention need not be limited to the particular application of the embodiment (ie the transportation of seedlings) but can have application in other circumstances where it is undesirable to have the goods stored on the stacking trays bearing any of the weight of overlying stacking trays.

Claims

The claims defining the invention are as follows:

1. A stacking rack comprising a substantially planar tray having two opposed sides, each opposed side supporting a plurality of downwardly depending legs wherein the legs at one side are spaced apart along the side by a first spacing and the legs at the other side are spaced apart by a second spacing, the first spacing being less than the second spacing, each opposed side supporting a set of supports which are in one to one relationship with the legs of the opposed side, each support being configured to receive the lower end of a leg, the supports at the one side being spaced apart by the second spacing and the supports at the other side being spaced apart by the first spacing, each of the legs having an open upper end and having an internal configuration which is able to receive another leg through the upper end to at least partially accommodate the other leg.

2. A stacking rack as claimed at claim 1 wherein, two legs are located along each side.

3. A stacking rack as claimed at claim 1 or 2 wherein each support and each leg is located outward of the perimeter of the tray.

4. A stacking rack as claimed at any one of the preceding claims wherein each leg is of a substantially V-shaped configuration.

5. A stacking rack as claimed at any one of claims 1 to 3 wherein each leg is of a substantially U-shaped configuration.

6. A stacking rack as claimed at any one of claims 1 to 3 wherein each leg is of a generally tubular configuration.

7. A stacking rack as claimed at any one of claims 1 to 3 wherein each leg is of a substantially W-shaped configuration.

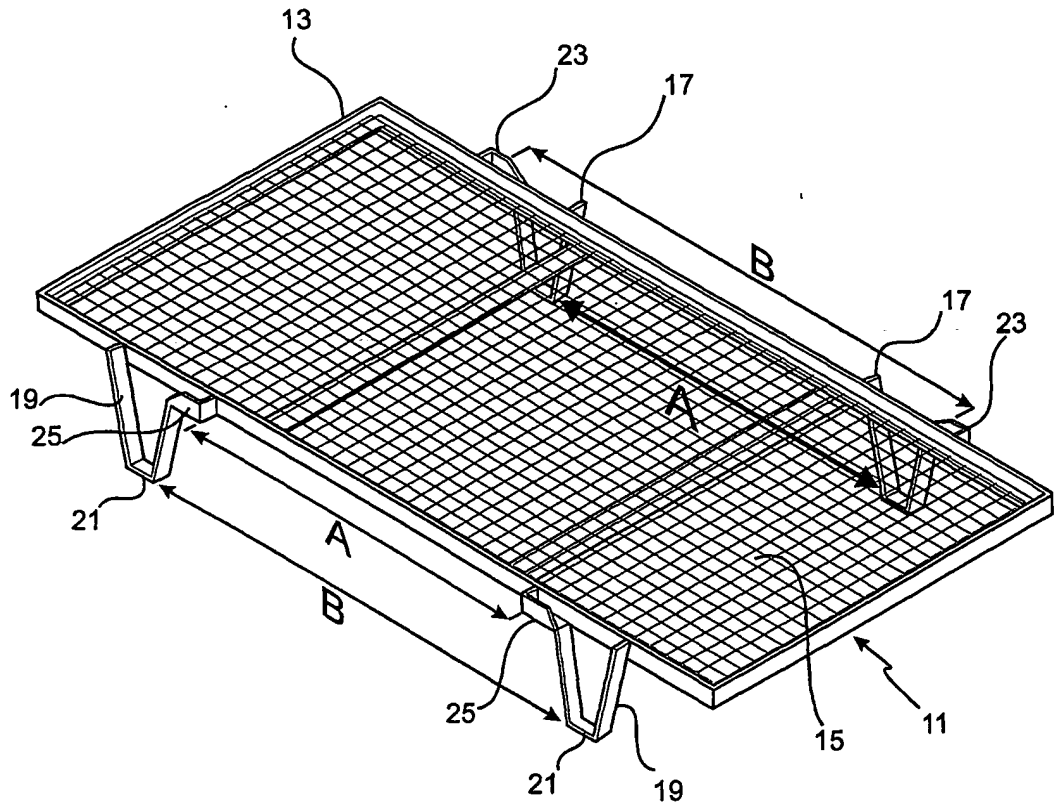

Fig. 1

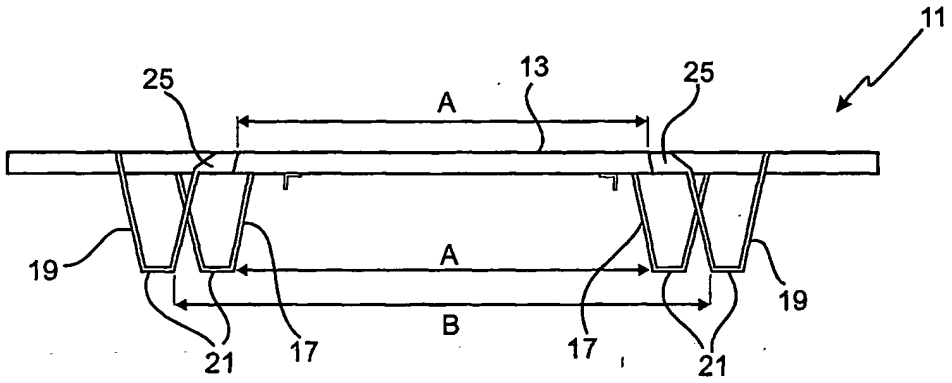

Fig. 2

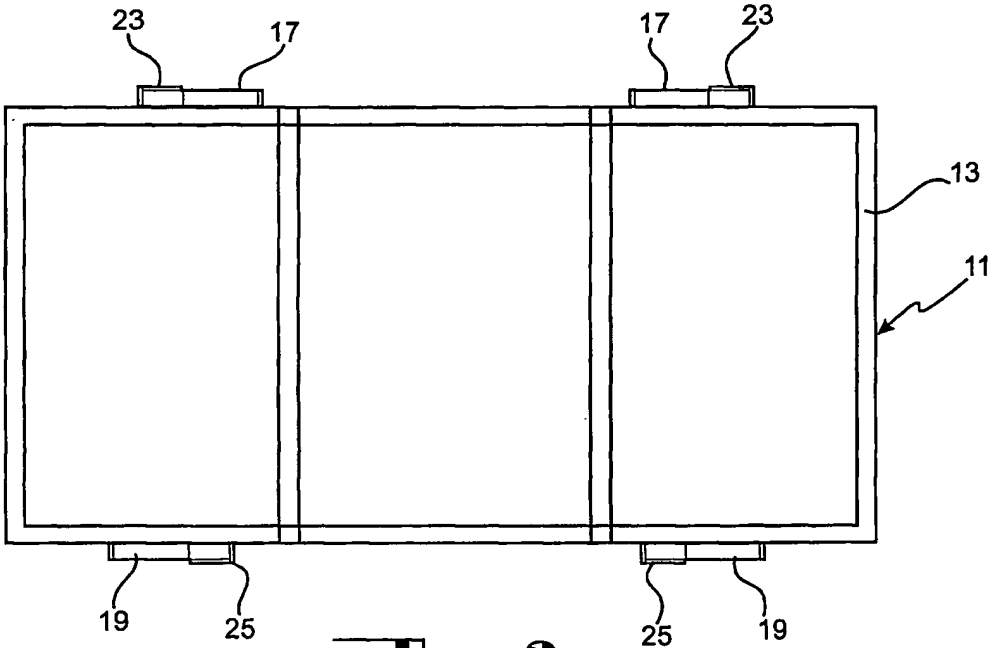

Fig. 3

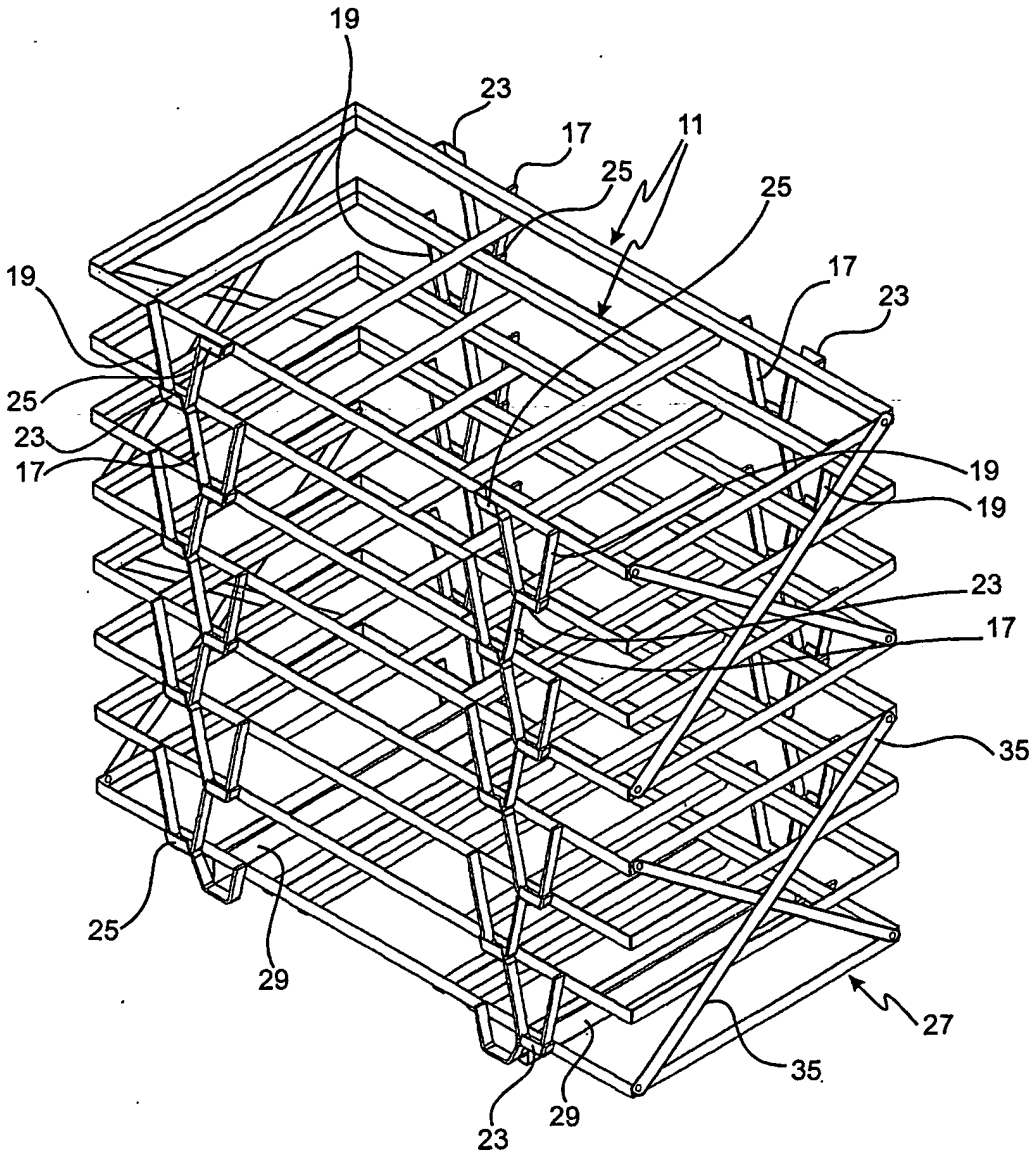

Fig. 4

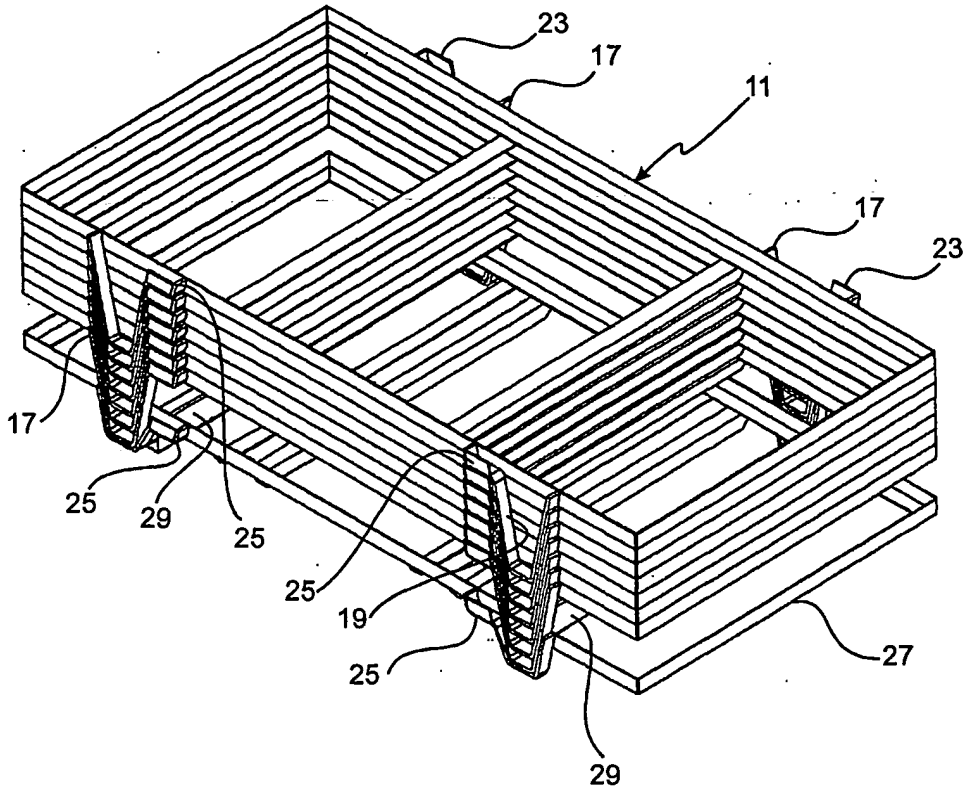

Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU01/00783

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. [7]: B65D 19/40, 19/28, 21/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
REFER ELECTRONIC DATA BASE CONSULTED BELOW

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
AU: IPC B65D 19/38, 19/40, 21/04

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
DWPI-IPC B65D 19/-, 21/-, B65G 1/-, A47B 43/- & keywords: pallet, rack, stack, leg, shape, offset, nest, rotate and similar terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2661155 A1 (SCATTOLIN) 25 October 1991 See whole document	1-7
X	US 5664934 A (SCHAEDE et al) 9 September 1997 See whole document	1-7
X	FR 2354700 A (CURVER B.V.) 13 January 1978 See whole document	1-7

☐ Further documents are listed in the continuation of Box C ☒ See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
6 August 2001	17 AUGUST 2001
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized officer A.G. ADRIANO GIACOBETTI Telephone No : (02) 6283 2579

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/AU01/00783

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
FR	2661155	NONE					
US	5664934	AU	37971/95	CA	2164183	CN	1132173
		EP	725027	JP	8-239156	US	5738487
FR	2354700	BE	855808	NL	7606555		

END OF ANNEX